TM-2912/000/00

# TECHNICAL MEMORANDUM

(TM Series)

SURF: Support of User Records and Files
DESCRIPTION AND OPERATION

By

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ABSTRACT

SURF is an EDP-based service for Support of User Records and Files. SURF is designed to meet, or be adaptable to, a variety of unique requirements fulfilling the needs of individuals in organizing, maintaining and finding what is in their personal files, without extensive reprogramming for unusual or special demands. It is programmed in SDC's MADAM language which is implemented for an 8K IBM 1401, or IBM 360/30 with 1401 emulator.

This document describes SURF routines and associated operational requirements in detail sufficient for using the programs. Included are a summary of the history and purpose of SURF development, SURF usage, and a functional description of inputs, outputs and processes. Three appendices present complete listings of instructions for each routine, examples of the variety of inputs and outputs required by different SDC users, and operational instructions to keypunch and machine operators.

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## 1. INTRODUCTION

For many years diverse techniques have been explored to find more effective ways of determining and satisfying the variegated and changing information requirements of technical personnel. Almost all of these studies and developments have concentrated upon centralized systems and services: libraries, information centers, dissemination techniques, and centralized indexing for individual scientists and technologists. Over the past three years a project at SDC has been exploring the potentials of EDP from a different standpoint--that of aiding individuals directly with an EDP-based service that could be responsive to their unique requirements and habits of work.

Experimentation and development of an indexing support system was begun in 1962. The system, programmed for an IBM 1401, accepted indexing information provided by each user on rigidly formatted coding sheets, and produced a variety of listings for him at regular intervals. This initial configuration, while useful, was limited in flexibility and capacity. More importantly, it imposed an onerous burden of coding labor for input. In the spring of 1965, it was decided to use the then newly developed MADAM system and language to build a more capable service that would retain the adaptability to user's work habits, vocabulary, and viewpoints while reducing the input labor required. The result is the present SURF system.

In addition to providing useful service, SURF is intended to furnish a tool for study of user indexing behavior and more effective means of determining and specifying individual information requirements. These latter have been studied almost entirely through survey techniques of interview, diary or questionnaire, and statistical records of centralized services. SURF builds a machine-readable record of user indexing practice as a by-product of rendering service. Direct observation of SURF users through examination of these records can not only give evidence on individual habits and perspectives hardly obtainable in any other way, but can also identify information they regard of real importance.

## 2. USAGE

This document describes SURF routines and the operational requirements associated with them in detail sufficient for using the programs and operating the service. The reader is referred to companion document TM-2913/000/00, A User's Guide to SURF: Support of User Records and Files, for a full description of requirements for entering and using the service from the customer standpoint.

SURF routines are written in SDC's MADAM programming language and are card programmed. The processing configuration required includes an IBM 1401 with four-six tape drives or an IBM 360/30 with 1401 emulator. All I/O and processing operations are under the control of a MADAM system tape. Familiarity

with MADAM documentation is not essential, but would be helpful to anyone operating SURF, particularly where modifications to SURF products are sought for requirements not now met. Relevant documentation is listed in the references, section 4.

Inputs to SURF consist of coding sheets filled out by users of the service and sent to a central point, where they are converted to 80-column EAM cards. These data cards are inserted in the SURF program deck and processed to produce printed indexes for each user. Normally, several user's inputs are processed together, merged with prior update tapes containing those user's files, and the new tapes saved for future updates or analysis after printing. As will be seen in the following functional description, several options and alternative routines are available for meeting special needs.

Customers of the service have applied SURF to a variety of materials including indexes to technical literature and correspondence, engineering data, trade catalog citations, a dictionary of grammar rules for syntactic analysis, and an inventory of program routines for a developing system. Some examples of these uses are given in Appendix B. Figures 1 and 2 illustrate the kind of inputs and outputs provided for a bibliographic application. The output listings are commonly provided on unlined, single-part, medium-width paper and consist of a coding sheet proof and up to four alphabets for each index. Regular updates are scheduled monthly, with special listings provided more often on demand.

## 3. FUNCTIONAL DESCRIPTION

The following description is divided into inputs, outputs and processes. Processes include descriptions of the general flow of a typical update, basic update routines, special-purpose routines and process options. Complete listing of SURF instructions for each routine are presented in Appendix A. Keypunch instructions for SURF inputs and machine operator instructions for initiating the MADAM system and running SURF jobs are given in Appendix C.

### 3.1 INPUTS

Figure 1 illustrates the input provided by SURF users on coding sheets and the resultant punched cards. The first three columns are dedicated to user identification, in this case his initials inverted, followed by the number of his index. Thus a user could provide himself with several indexes for different materials by assigning different index numbers. Two columns are dedicated to an output format code that identifies the set of SURF routines to be applied to this input and the form of listing desired. Columns 6-9 are dedicated to the number of the entry assigned by the user to each indexed item, and column 10 to the card number. Users need to enter the ID and format codes only once on each coding sheet, and the entry and first card number once for each item indexed. Card numbers are incremented as needed by the keypunch operator.

**SURF Input Coding Sheet**

Name: Everett Wallace Room 9935 Ext. 6561 Date: 65/10/18

| ID Code 1-3 | Output Format 4-5 | Entry No. 6-9 | Card No. 10 | Numbered Fields + Field Contents 11-79 |
|---|---|---|---|---|
| WE1 | A1 | 0002 | 1 | 1) Wallace, Everett M. 2) experience with edp support of individuals' file maintenance. 3) system development corp. 4) 64/07/07. 5) sdc sp-1646. 6) reports on a prototype system and plans for modification and improvement in the light of experience. 7) ibm 1401 programs 7) edp support of user records and files 7) indexing support to individuals |
| | | 0003 | 1 | 1) Crossley, William D. 2) the madam system. 3) system development corp. 4) 65/08/05. 5) sdc tm-2198/001/00. 6) describes version II. 7) madam 7) ibm programs 7) programming languages |

WE1A100033ADAM 7) IBM 1401 PROGRAMS 7) PROGRAMMING LANGUAGES

WE1A100032PP. 4) 65/08/05. 5) SDC TM-2198/001/00. 6) DESCRIBES VERSION II. 7) M

WE1A100031) CROSSLEY, WILLIAM D. 2) THE MADAM SYSTEM. 3) SYSTEM DEVELOPMENT CO

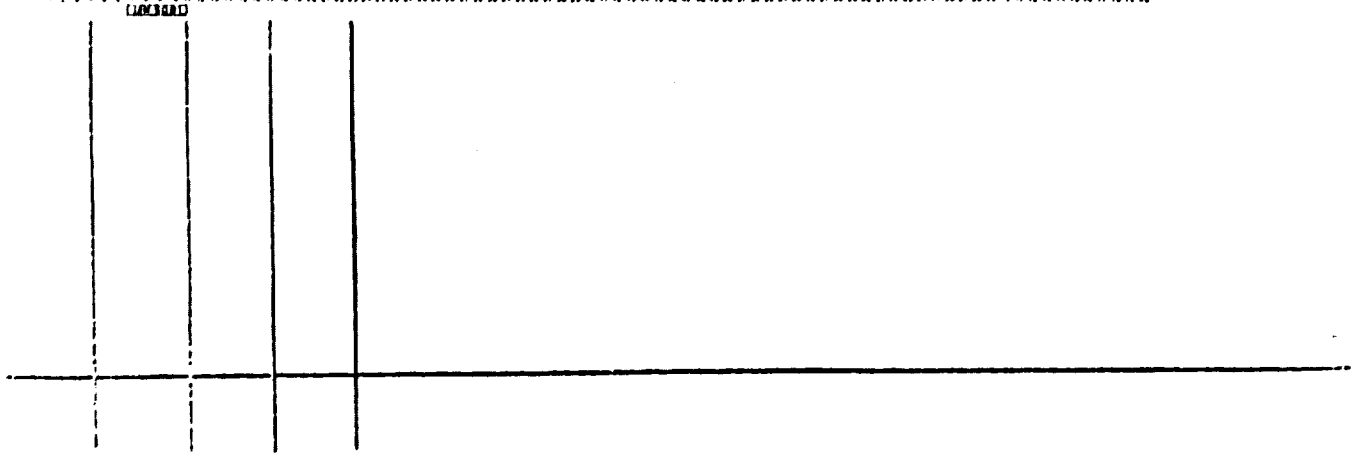

Figure 1. Examples of SURF Inputs

CODING SHEET PROOF FOR WE1

```
ENTRY  0002                                              FORMAT  A1
1 1) WALLACE, EVERETT M. 2) EXPERIENCE WITH EDP SUPPORT OF INDIVIDUALS'
2  FILE MAINTENANCE. 3) SYSTEM DEVELOPMENT CORP. 4) 64/07/07. 5) SDC SP
3 -1646. 6) REPORTS ON A PROTOTYPE SYSTEM AND PLANS FOR MODIFICATION AN
4 D IMPROVEMENT IN THE LIGHT OF EXPERIENCE. 7) IBM 1401 PROGRAMS 7) EDP
5  SUPPORT OF USER RECORDS AND FILES 7) INDEXING SUPPORT TO INDIVIDUALS

ENTRY  0003                                              FORMAT  A1
1 1) CROSSLEY, WILLIAM O. 2) THE MADAM SYSTEM. 3) SYSTEM DEVELOPMENT CO
2 RP. 4) 65/08/05. 5) SDC TM-2198/001/00. 6) DESCRIBES VERSION II. 7) M
3 ADAM 7) IBM 1401 PROGRAMS 7) PROGRAMMING LANGUAGES
```

SURF INDEX

FIELD NO. 1 FOR WE1 ENTRY NO.

```
CROSSLEY, WILLIAM O.                                                    3
        CROSSLEY, WILLIAM O.  THE MADAM SYSTEM.  SYSTEM DEVELOPMENT CORP
        .  65/08/05.  SDC TM-2198/001/00.  DESCRIBES VERSION II.
WALLACE, EVERETT M.                                                     2
        WALLACE, EVERETT M.  EXPERIENCE WITH EDP SUPPORT OF INDIVIDUALS'
        FILE MAINTENANCE.  SYSTEM DEVELOPMENT CORP.  64/07/07.  SDC SP-
        1646.  REPORTS ON A PROTOTYPE SYSTEM AND PLANS FOR MODIFICATION A
        ND IMPROVEMENT IN THE LIGHT OF EXPERIENCE.
```

SURF INDEX

FIELD NO. 7 FOR WE1 ENTRY NO.

```
EDP SUPPORT OF USER RECORDS AND FILES                                   2
        WALLACE, EVERETT M.  EXPERIENCE WITH EDP SUPPORT OF INDIVIDUALS'
        FILE MAINTENANCE.  SYSTEM DEVELOPMENT CORP.  64/07/07.  SDC SP-
        1646.  REPORTS ON A PROTOTYPE SYSTEM AND PLANS FOR MODIFICATION A
        ND IMPROVEMENT IN THE LIGHT OF EXPERIENCE.
IBM 1401 PROGRAMS                                                       3
        CROSSLEY, WILLIAM O.  THE MADAM SYSTEM.  SYSTEM DEVELOPMENT CORP
        .  65/08/05.  SDC TM-2198/001/00.  DESCRIBES VERSION II.
IBM 1401 PROGRAMS                                                       2
        WALLACE, EVERETT M.  EXPERIENCE WITH EDP SUPPORT OF INDIVIDUALS'
        FILE MAINTENANCE.  SYSTEM DEVELOPMENT CORP.  64/07/07.  SDC SP-
        1646.  REPORTS ON A PROTOTYPE SYSTEM AND PLANS FOR MODIFICATION A
        ND IMPROVEMENT IN THE LIGHT OF EXPERIENCE.
INDEXING SUPPORT TO INDIVIDUALS                                         2
        WALLACE, EVERETT M.  EXPERIENCE WITH EDP SUPPORT OF INDIVIDUALS'
        FILE MAINTENANCE.  SYSTEM DEVELOPMENT CORP.  64/07/07.  SDC SP-
        1646.  REPORTS ON A PROTOTYPE SYSTEM AND PLANS FOR MODIFICATION A
        ND IMPROVEMENT IN THE LIGHT OF EXPERIENCE.
MADAM                                                                   3
        CROSSLEY, WILLIAM O.  THE MADAM SYSTEM.  SYSTEM DEVELOPMENT CORP
        .  65/08/05.  SDC TM-2198/001/00.  DESCRIBES VERSION II.
PROGRAMMING LANGUAGES                                                   3
        CROSSLEY, WILLIAM O.  THE MADAM SYSTEM.  SYSTEM DEVELOPMENT CORP
        .  65/08/05.  SDC TM-2198/001/00.  DESCRIBES VERSION II.
```

**Figure 2. Examples of SURF Outputs**

Columns 11-79 are free of formatting restrictions and contain the elements of information within each entry that are to be indexed. These elements are identified by the use of numbered fields. As illustrated by Figure 1, the beginning of each field is defined by a one-digit arabic numeral followed by a parenthesis and a space. The first card of each entry must begin with a field number in column 11. The user is free to enter up to 125 characters, including spaces, after a given field number. On output, fields identified with the same odd number, i.e., 1) 3) 5) 7) are sorted and listed alphabetically by their contents, thus providing up to four alphabets within a single index. Even-numbered fields, i.e.. 2) 4) etc., identify information elements not to be sorted. For a single entry, SURF accepts that which can be contained within 9 punched cards, or, for the entry contents proper, a limit of 621 characters including spaces.

For purging their files of obsolete or unwanted entries, users may submit a coding sheet containing ID, format and entry number information, and, in place of card number, the letter D, leaving the area of the coding sheet devoted to columns 11-79 blank. Implementation of this feature is described in sections 3.3.1.3 and 3.3.2.2.

## 3.2 OUTPUTS

Figure 2 illustrates the two kinds of output generated by SURF using the input samples of Figure 1. These consist of a coding sheet proof and SURF indexes, each supplied with standard headings identifying the user and the kind of index. The coding sheet proof presents a facsimile of the card images arranged by entry number and card number and printed in lines of 71 characters. The indexes are printed in lines of 74 characters with the body of the entries indented 9 spaces following the sorted elements for each field. The field numbers have been replaced by spaces and the leading zeros stripped from the entry numbers. The contents of field 7) have been edited out from the body of the entries under format option A1.

The philosophy underlying this design is complete information at every point with an option to the user of having chosen sortable elements appear only once as an alphabetic key. In the example shown, that of bibliographic citation, field 1) was assigned to authors, 2) to title, 3) to source or number, 4) to date and comment, and 7) to subject keys which are deleted from the entries under format option A1. Format option B1 retains the contents of field 7) in the body of the entries as listed. The effect of using the A1 option is to shorten the indexes. Process implications of these options are given in section 3.3.3.2 and further examples in Appendix B.

## 3.3 PROCESSES

Figure 3 presents the general flow of a typical SURF update. As can be seen, the keypunched input is inserted in the SURF Specification deck and read. The specifications include program instructions and instructions to machine operators for mounting and saving tapes for the basic processes and for any special routines inserted in the flow for deletion, editing or selective print. All operations are under the control of a MADAM operating system tape, mounted on tape drive #1.

### 3.3.1 Basic SURF Update Routines

#### 3.3.1.1 Load & Sort

The LOAD operation reads the input data cards and builds a file of card images on tape drive #2, inverting the relative positions of the ID and format codes. The SORT instruction reads: SORT 1,2 BY 0,10,80 END which means, "sort file 1 drive 2 by format, user, entry and card number with records not exceeding 80 characters." The specification of "80" provides the most efficient use of the dynamic core allocation feature of this MADAM process.

#### 3.3.1.2 PRINT Entry Records

This routine produces the coding sheet proof illustrated in Figure 2, from the card records on file 1 of tape drive 2.

#### 3.3.1.3 ABSTRACT Entry Records (i.e., Merge)

The entry record merge is initiated by the instruction: ABSTRACT 1,3 FROM 1,5 BY 1,2 which means, "merge the first file of drives 5 and 2 onto drive 3." The process is equivalent to a single sort pass through ordered files comparing the first ten characters of each card image. The routine also implements the deletion feature described in Section 3.1. That is, it does not write any record from the old entry record tape if the update contains the same entry number and the letter D instead of a card number.

The routine is normally followed by a copy instruction: COPY 1,5 FROM 1,3 END copying the merged file back onto drive 5, thus permitting the process to proceed without interruption. If an additional generation of entry record files is desired to be retained as a protection against tape damage, the COPY instruction would be replaced by a halt instruction:****
SAVE TAPE 3 REPLACE BY A BLANK PRESS START.

#### 3.3.1.4 FORMAT Card Images

This is the first of three format operations and is initiated by the instruction FORMAT 1,3 FROM 1,2. The card images are scanned to locate and compute the length of entries and fields within entries. Each entry is then written as a single record. If through input error more than nine card

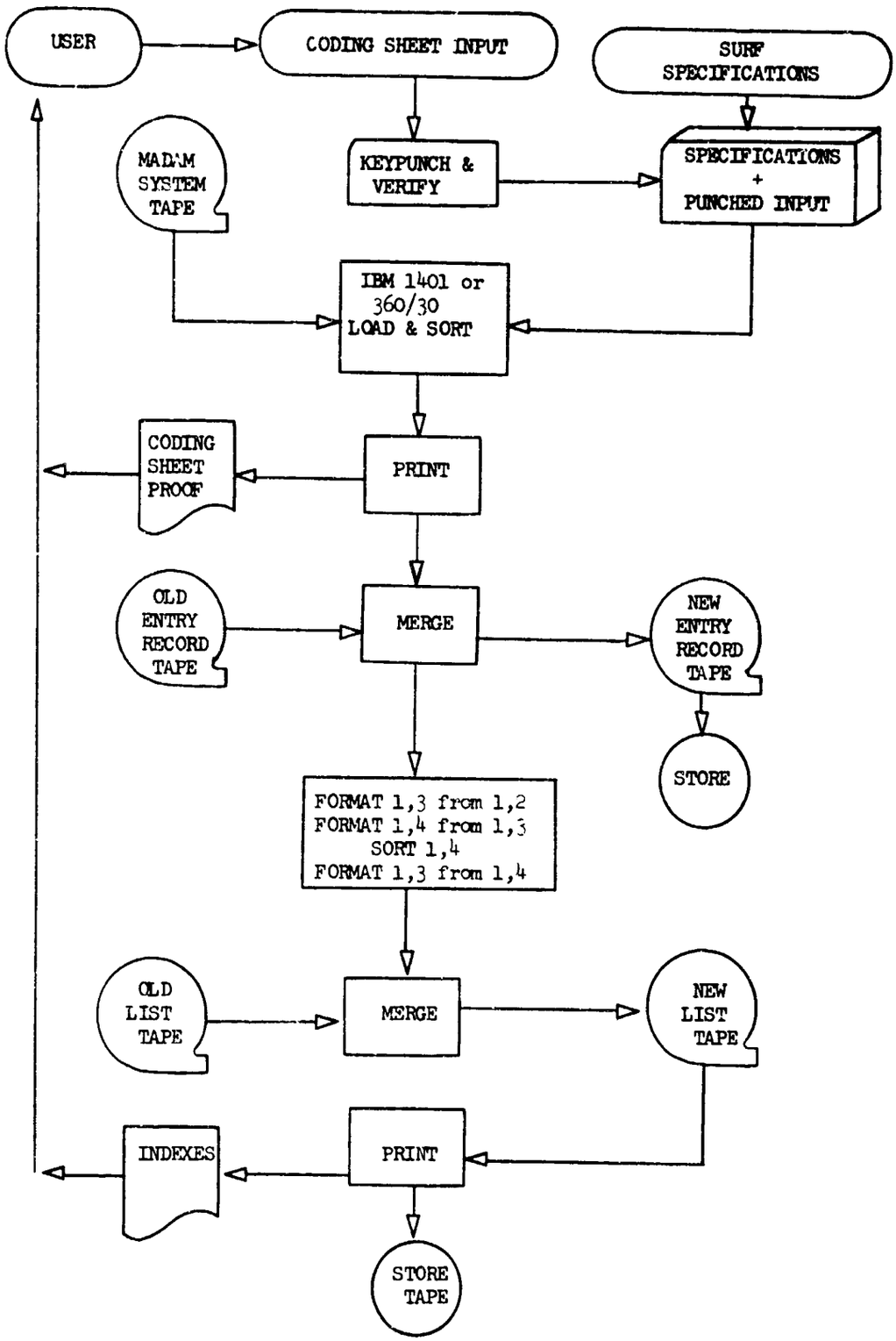


Figure 3. General Flow of SURF Update

images are identified with the same entry number, the routine processes the first nine and passes on to the next entry. If a user fails to observe the 125-character limit of a single field, the routine constructs a new field with the same field number for the overflow.

3.3.1.5 FORMAT To Duplicate Records by Sortable Elements and SORT

FORMAT 1,4 FROM 1,3 processes the records generated by the preceding format routine such that records of 900 characters are duplicated for each sortable field within a record. The first fifty characters of each sortable field, which begins with field number, is placed in the last 50 positions of each record to furnish part of the sort key for the following SORT instruction. The sort orders these records alphanumerically first by user code, then the 50 characters of the sortable fields, and finally by the first 30 characters of the body of each entry.

3.3.1.6 FORMAT List Tape

The final format operation begins with the instruction FORMAT 1,3 FROM 1,4. It lays out print lines justified at position 74 in records of 102 characters. Positions 80 to 102 contain user code, field number, entry number and the first 12 characters of the body of the entry.

3.3.1.7 ABSTRACT List Records (i.e., Merge)

The merge of the old list tape with the update begins with the instruction ABSTRACT 1,4 FROM 1,6 BY 1,3. It orders upon user code, field number, up to 30 characters of the alphabetized records, and, in cases of equality in the above data, upon the first 12 characters of the entry.

3.3.1.8 PRINT List Records

PRINT 1,4 initiates the listing of the updated user indexes illustrated in Figure 3. The routine tests for user, field number and length of page, setting up standard headings as per the figure. The headings are readily modified to fit particular requirements. This is the final routine in the basic update process. The last instructions in the specification deck are RESTORE, to space up the paper, POSITION 1,3 1,4 1,5 1,6 END, to rewind tapes and ****END OF JOB SAVE TAPES 3 4 5 6.

3.3.2 Special Purpose Routines

3.3.2.1 ABSTRACT From CARDS for Deletion of Entry Records

This routine is used for special deletions from long entry record files in lieu of deleting in the course of an update using the card number with D discussed in section 3.3.1.3. It compares on user code and entry numbers, writing only those records that are not equal. It will delete between 1 to 15 records on a single pass. The set of program instructions is followed

immediately by a card containing user code in col. 1-3, and entry numbers beginning in column 5, and every 5th column thereafter, i.e., 10, 15, 20, etc., to the end of the card. Blanks on the card are ignored. If used in conjunction with a regular update, the deck beginning with the instruction ABSTRACT 1,3 FROM 1,5 BY CARDS would be inserted in front of the regular specification deck. It would be followed by COPY 1,5 FROM 1,3 END, thus deleting required entries from the old entry record tape, and copying back onto reel 5.

3.3.2.2 ABSTRACT from CARDS for Deletion of List Records

The instructions for this process are nearly identical with those of #9 above except that the entry number is in a different location on the list tape records. Again, if used in conjunction with a regular update, the instructions and data card for this routine would be inserted in the specification deck prior to merging the processed update with the old list tape, i.e., before the ABSTRACT routine already described in section 3.3.1.7.

3.3.2.3 FORMAT for Modification of List Records (SL3 FORMAT)

The list tape records for the normal update process contain 102 characters, the last 12 of which are used for comparison in merging list tapes to alphabetize by contents of entry when the index (i.e., sorted and alphabetized) terms are the same. For some kinds of data twelve characters will not be sufficient to effect a strict ordering. This routine reformats list tape records processed by the normal update to a size of 110 characters, extending the entry record data to 20 characters.

3.3.2.4 FORMAT for Special Listings

The normal update process produces indexes in which there is complete entry information at every point. Two routines are available for selection of parts of the entries to be written as a new list tape.

SL1 FORMAT is intended to be used for analyzing the vocabulary of indexes. User ID can be used to select one or more users' records. If all users in a file are to be combined, the card containing the instruction testing user ID is withdrawn from the deck. The routine tests and writes all records that do not begin with blanks, i.e., the sorted elements. If it is desired to consolidate the vocabularies of diverse users, the routine is followed by a sort instruction: SORT 1,4 BY 0,49 AND 90,12,102 END.

SL2 FORMAT may be used instead of a special print routine for selection of data to be printed as an index. This is often more economical than using the print routine for long files. An example of this usage is given in TM-2921/000/00, Index to Documents of Multi-Department Technical Interest. In that index, field number 3 was assigned to document number and field

number 7 to organization code. Instead of providing complete entry information for these indexes, it was desired to provide only sufficient data for cross reference to the author index, i.e., the sorted element, the first twelve characters of the entry, and the entry number. The resultant print line appears as: TM-0000/000/00 AUTHOR NAME 3681

3.3.2.5 PRINT Modifications

The print specifications for the normal update specify standard headings as shown in figure 3. These are readily changed. Examples and instructions for different headings are given in the MADAM documentation.

Frequently a file will contain many user's records of which only one or two will be updated for a given run. If it is desired to print only certain users' records, a card can be inserted immediately after the READ instruction at the beginning of the PRINT routine that is formatted as follows: IF ANY 80,3 NQ (user ID codes separated by a space) DO A. That is, the occurrence of any ID code in the tape record that does not match those contained within the parentheses will cause the routine to read the next record.

The PRINT routine corresponding to the SL2 FORMAT routine for selection of index data is given in Appendix A. This particular routine tests on field number and reads by all records that begin with blanks, i.e., the body of the entries, for the fields selected to be printed in the format given above under the description of SL2. There are many alternative selections that are easily implemented for special printouts given some familiarity with the MADAM language and routines.

3.3.3 Process Options

3.3.3.1 Sortable Field Changes

There are a number of changes that may be made in the basic SURF routines for particular requirements through altering but one or two instructions. For example, if more than four sortable fields are needed to provide additional alphabets in the indexes, the second card in the FORMAT routine described in section 3.3.1.5 may be replaced. That card now reads: SET (1357) AT TEMP 10. If two additional alphabets were desired the card could be replaced by one reading: SET (123457) AT TEMP 10, thus specifying field numbers 2 and 4 as sortable. In addition the sixth card in that routine would be replaced by one reading: IF ANY TEMP 10,6 NQ IN 0',1 DO 4.

3.3.3.2 Field Deletions from Entries

At present the only difference between format options A1 and B1 is the presence or absence, respectively, of the 15th card in the FORMAT routine described in section 3.3.1.6. That card reads: OR IN 0',1 EQ (7). When present, the instruction deletes the contents of field #7 from the body of the entries in laying out the print lines. If it were desired to extend

the deletion to another sortable field, say field #5, the instruction would be changed to read: OR IN O',1 EQ (5) OR IN O',1 EQ (7). This would have the effect of further shortening the entries within the indexes, while still preserving an alphabetic key to the contents of fields #5 and #7. The instruction could be extended to include any or all sorted fields.

3.3.3.3 Four Tape Operation

For those configurations using SURF that include four tape drives rather than six, it will be necessary to insert a halt instruction, i.e., four asterisks--****--followed by instruction to the machine operators for mounting and demounting tapes before and after the first ABSTRACT routine (section 3.3.1.3) and before the second ABSTRACT routine (section 3.3.1.7). Otherwise, the basic process is identical with six-tape operation, except that the initial instructions for each routine must call out the appropriate tape drives. A similar requirement is imposed when a file is built for the first time, i.e., without any prior entry record or list tape to merge with the initial data processed.

## 4. REFERENCES

Christie, Lee, et al. Index to Documents of Multi-Department Technical Interest. SDC document TM-2921/000/00, April 29, 1966.

Crossley, William O. The MADAM System. SDC documents TM-2198/001/00, August 5, 1965, and TM-2198/002/00, December 2, 1965.

Wallace, Everett M. A Users' Guide to SURF; SUPPORT of User Records and Files. SDC document TM-2913/000/00, May 12, 1966.

Wallace, Everett M. Experience with EDP Support of Individuals' File Maintenance. SDC document SP-1646, July 7, 1964.

# 5. APPENDIX A: COMPLETE LISTING OF PROGRAM INSTRUCTIONS

This Appendix presents a listing of the SURF routines in the order in which they were described in the preceding text for the basic SURF update and special purpose routines, and references relevant text sections. Process options are dealt with in the course of presentation together with such description as seems necessary.

## 5.1 BASIC SURF UPDATE ROUTINES

### 5.1.1 LOAD & SORT (See Also Section 3.3.1.1)

```
LOAD FILE 1 TAPE 2 FROM CARDS
RFADER, THE FIELDS TO BE INCLUDED ARE AS FOLLOWS
CARD NUMBER        BEGIN WITH COLUMN        FIELD SIZE        TO BE PLACED AT
    1                      1                    3                  2
    1                      4                    2                  0
    1                      6                    5                  5
    1                     11                   69                 10
THIS IS THE END OF THIS OPERATION.
SORT 1,2 BY 0,10,80  END
```

### 5.1.2 PRINT Entry Records (See Also Section 3.3.1.2)

```
PRINT 1.2
1.  READ
    IF LINE 0,3 EQ (1)  DO 5
    A.  IF 2,3 NQ TEMP 0,3 RESTORE AND SET (001)
        AT PAGE 0,3 AND DO 4
    B.  IF LINE 0,3 GR (55) RESTORE DO 4
    C.  IF 5,4 NQ TEMP 3,4 DO 5
2.  SET 9,1 AT OUT 0 AND 10,69 AT OUT 2 AND 2,3 AT TEMP 0,3
3.  PRINT DO 1
4.  SET ( CODING SHEET PROOF FOR) AT OUT 20
    AND 2,3 AT OUT 43 AND (PAGE) AT OUT 67
    AND ADJUST PAGE 0,3 NUMBER AT 74
    PRINT SKIP 2 DO C
5.  SET (ENTRY) AT OUT 0 AND (FORMAT) AT OUT 47
    AND 5,4 AT OUT 7 AND 0,2 AT OUT 55
    AND 5,4 AT TEMP 3,4 SKIP 1 PRINT DO 2
END OF SURFPRINT-1
```

### 5.1.3 ABSTRACT Entry Records (See Also Section 3.3.1.3)

```
ABSTRACT 1,3 FROM 1,5 BY 1,2
 1.  READA
     IF ENDA SET (999999999) AT INA 0
 2.  READB
 3.  IF ENDB SET (999999999) AT INB 0
```

```
 4.  IF INA 0,9 GR INB 0,9 DO 9
 5.  IF INA 0,9 LS INB 0,9 WRITE INA 0,80 READA DO 11
 6.  IF INB 9,1 EQ (D) READA DO 4
 7.  IF INA 0,9 EQ (999999999) STOP
 8.  WRITE INB 0,80 DO 1
 9.  IF INB 9,1 NQ (D) WRITE INB 0,80
10.  DO 2
11.  IF ENDA SET (9999°3999) AT INA 0
12.  DO 4 END ENTRY-RECORDS-MERGE
COPY 1,5 FROM 1,3 END
```

5.1.4 FORMAT Card Images (See Also Section 3.3.1.4)

```
FORMAT 1,3 FROM 1,2
READ SET (     )) AT TERM 0
 1.   SET (115109112115) AT TEMP 0 AND IN 0,9 AT IN 100 AND (0) AT TEMP 15
 1A.  DO 3
 2.  READ
     IF END OR IN 0,9 NQ IN 100,9 DO 10
     IF IN 10,1 EQ ( ) AND TERM 5,1 NQ ()) SET ( ) AT IN 9'
     COMPUTE TEMP 9,3 + (1) = TEMP 9,3
 3.  SCAN IN 10,69
 4.  SET ( ) AT TERM 5
     IF NEXT WORD EQ NUMERIC AND TERM 5,1 EQ ()) AND TEMP 203,3 EQ (1)
     SET (  ) AT IN 9' DO 8
 5.  COMPUTE TEMP 9,3 - TEMP 0,3 + TEMP 203,3 = TEMP 18,3
     IF TEMP 18,3 GR (130) DO 10
 6.  SET WORD AT IN 9'
     COMPUTE TEMP 9,3 + TEMP 203,3 = TEMP 9,3
     IF TEMP 9,3 GR (947) SET (947) AT TEMP 9 DO 10
     IF MORE SET TERM 5,1 AT IN 9' DO 6A
 7.  IF IN 78,1 EQ ( ) SET ( ) AT IN 9'
     COMPUTE TEMP 9,3 + (1) = TEMP 9,3
 7A. DO 2
 6A. COMPUTE TEMP 9,3 + (1) = TEMP 9,3
     IF MORE DO 4
 6B. DO 2
 8.  IF TEMP 15,1 EQ (0) SET (1) AT TEMP 15 DO 11A
 9.  COMPUTE TEMP 9,3 + (2) = TEMP 9,3
10.  COMPUTE TEMP 6,3 - (97) = IN 3',3
10A. COMPUTE TEMP 9,3 - TEMP 0,3 = IN 6',3
     COMPUTE TEMP 9,3 = TEMP 3,3 + (3) = TEMP 6,3 & (3) = TEMP 9,3
     IF IN 0,9 NQ IN 100,9 DO 12
     IF TEMP 3,3 EQ (947) DO 12
11.  SET TEMP 9,3 AT TEMP 0
     IF TEMP 18,3 GR (130) DO 14
11A. SET WORD AT IN 9' DO 6A
```

```
12.   SET (XXX) AT IN 3'
      COMPUTE TEMP 3,3 - (97) = TEMP 12,3
      WRITE IN 100,12'
      IF END STOP
13.   IF IN 0,9 EQ IN 100,9 READ DO 13
13A.  DO 1
14.   SET ( ) AT IN 9'
      COMPUTE TEMP 9,3 + (1) = TEMP 9,3 DO 5
      END
```

5.1.5 FORMAT to Duplicate Records by Sortable Elements and SORT (See Also Section 3.3.1.5)

```
FORMAT 1,4 FROM 1,3
    SET (1357) AT TEMP 10
1.  SET (009000) AT TEMP 0
    READ
2.  SET IN 0',6 AT TEMP 0
    IF ANY TEMP 10,4 NQ IN 0',1 DO 4
3.  SET IN 0',3' AT IN 850
    WRITE IN 0,900
    SET TEMP 40,50 AT IN 850
4.  COMPUTE TEMP 0,3 + TEMP 3,3 = TEMP 0,3
    IF IN 0',3 EQ (XXX) DO 1
5.  DO 2 END
SORT 1,4 BY 2,3 AND 850,50 AND 16,30,900 END
```

5.1.6 FORMAT List Tape (See Also Section 3.3.1.6)

```
FORMAT 1,3 FROM 1,4
1.    READ
      SET IN 2,3 AT OUT 80
      SET IN 5,4 AT OUT 34
      SET IN 16,12 AT OUT 90
      SET IN 850,1 AT OUT 83
      SET (009000009000) AT TEMP 0
      SET IN 851,49 AT OUT 0
1A.   ADJUST IN 5,4 AT OUT 74 WRITE OUT 0,102
      SET IN 910,80 AT OUT 0
2.    IF IN 0',3 EQ (XXX)
      WRITE OUT 0,102 SET IN 910,80 AT OUT 0 DO 1
3.    SET IN 0',6 AT TEMP 0
      IF IN 0',1 EQ ( ) AND TEMP 12,1 EQ (T)
      OR IN 0',1 EQ (7)  *
```

*The presence or absence of this card respectively, deletes or does not delete the contents of field no. 7 from the body of entries, corresponding to format options A1 and B1.

```
     SET (T) AT TEMP 12 DO 7
     SET (0) AT TEMP 12
     COMPUTE TEMP 0,3 + (1) = TEMP 0,3
     COMPUTE TEMP 3,3 - (1) = TEMP 3,3
     COMPUTE TEMP 9,3 + TEMP 3,3 = TEMP 9,3
4.   IF TEMP 9,3 LQ (66) DO 6
5.   COMPUTE TEMP 9,3 - (66) = TEMP 9,3
     COMPUTE TEMP 3,3 - TEMP 9,3 = TEMP 3,3
     SET IN 0',3' AT OUT 6'
     WRITE OUT 0,102
     SET IN 910,80 AT OUT 0
     SET (009) AT TEMP 6
     COMPUTE TEMP 0,3 + TEMP 3,3 = TEMP 0,3
     SET TEMP 9,3 AT TEMP 3 DO 4
6.   SET IN 0',3' AT OUT 6'
     COMPUTE TEMP 6,3 + TEMP 3,3 = TEMP 6,3
7.   COMPUTE TEMP 0,3 + TEMP 3,3 = TEMP 0,3
     DO 2
END  RESTORE
```

5.1.7 ABSTRACT List Records (See Also Section 3.3.1.7)

```
     ABSTRACT 1,4 FROM 1,6 BY 1,3
     READB
1.   READA
     IF ENDA SET (99999999) AT INA 80 DO 2
     IF INA 0,2 EQ ( ) DO 3
2.   IF INA 80,8 EQ INB 80,8 DO 6
     IF INA 80,4 EQ INB 80,4 DO 8
     IF INA 80,8 GR INB 80,8 DO 4
3.   WRITE INA 0,102 DO 1
4.   WRITE INB 0,102 READB
     IF ENDB SET (99999999) AT INB 80 DO 2
     IF INB 0,2 EQ ( ) DO 4
5.   DO 2
6.   IF INA 80,8 EQ (99999999) STOP
7.   DO 3
8.   IF INA 0,4 GR INB 0,4 DO 4
     IF INA 0,4 LS INB 0,4 DO 3
     IF INA 0,30 EQ INB 0,30 DO 10
     IF INA 0,7 GR INB 0,7 DO 4
     IF INA 0,7 LS INB 0,7 DO 3
     IF INA 0,8 GR INB 0,8 DO 4
     IF INA 0,8 LS INB 0,8 DO 3
     IF INA 0,9 GR INB 0,9 DO 4
     IF INA 0,9 LS INB 0,9 DO 3
     IF INA 0,10 GR INB 0,10 DO 4
```

```
     IF INA 0,10 LS INB 0,10 DO 3
     IF INA 0,30 GR INB 0,30 DO 4
9.   DO 3
10.  IF INA 90,12 GR INB 90,12 DO 4
11.  DO 3
END
SURFMERGE PRINTAPES
```

5.1.8 PRINT List Records (See Also Section 3.3.1.8)

```
     PRINT 1,4
A.   READ
     IF IN 80,4 NQ TEMP 190,4 SET IN 80,4 AT TEMP 190,4 RESTORE
     IF LINE 0,3 GR (53) AND IN 0,2 NQ (  ) RESTORE
     IF LINE 0,3 EQ (1) SET (SURF INDEX) AT OUT 34
     PRINT SKIP 1 DO B ELSE.  DO C
B.   SET (FIELD NO.) AT OUT 0 AND IN 83,1 AT OUT 10
     SET (FOR) AT OUT 35 AND IN 80,3 AT OUT 40 AND (ENTRY NO.) AT OUT 66
     PRINT SKIP 2
C.   SET IN 0,78 AT OUT 0 PRINT  DO A
END OF SURFPRINT2
```

If a selection of users is desired because only a few are updated on a given run punch a card formatted as follows: IF ANY (xxx yyy zzz) NQ IN 80,3 DO A and insert in the PRINT deck above following the A. READ instruction. The content of the parentheses on the card would contain the various 3-digit ID codes of the selected users separated by blanks.

This routine is the last in the basic update process. Final instructions for a typical update are:

```
RESTORE
POSITION 1,3 1,4 1,5 1,6
**** END OF JOB  SAVE TAPES 3 4 5 6
```

5.2 SPECIAL PURPOSE ROUTINES

5.2.1 ABSTRACT from CARDS for Deletion of Entry Records (Also See Section 3.3.2.1)

```
ABSTRACT 1,3 FROM 1,5 BY CARDS
     READB
1.   READA
     IF ANY INB 0,3 EQ INA 2,3 DO 3
2.   WRITE INA 0,102 DO 1
3.   IF ANY INB 4,76 EQ INA 5,4 DO 1
4.   DO 2 END ENTRY-RECORD-DELETE
COPY 1,5 FROM 1,3 END
```

### 5.2.2 ABSTRACT from CARDS for Deletion of List Records (See Also Section 3.3.2.2)

```
ABSTRACT 1,2 FROM 1,6 BY CARDS
     READB
1.   READA
     IF ANY INB 0,3 EQ INA 80,3 DO 3
2.   WRITE INA 0,102 DO 1
3.   IF ANY INB 4,76 EQ INA 84,4 DO 1
4.   DO 2  END LIST-RECORD-DELETE
```

Use of this routine in the course of an update requires insertion in the SURF specification deck immediately before the merge routine given in section 6.1.7 and, in addition a change in the initial instruction of that routine to read: ABSTRACT 1,4 FROM 1,2 BY 1,3.

### 5.2.3 FORMAT for Modification of List Records (See Also Section 3.3.2.3)

```
SL3 FORMAT 1,3 FROM 1,2
1.   READ
     IF ANY IN 0,2 NQ (  ) SET IN 0,90 AT OUT 0 DO 3
2.   DO 4
3.   READ SET IN 9,20 AT OUT 90 WRITE OUT 0,110
4.   SET OUT 90,20 AT IN 90 WRITE IN 0,110
DO 1  END
```

### 5.2.4 FORMAT for Special Listings (See Also Section 3.3.2.4)

```
SL1 FORMAT 1,4 FROM 1,3 FOR USER VOCABULARY
1.   READ
     IF ANY IN 0,2 EQ (  ) DO 1
     IF ANY IN 80,3 NQ (***) DO 1          *** = user ID Code
     IF ANY IN 83,1 NQ (*) DO 1            * = selected field no.
2.   WRITE IN 0,102 DO 1  END
```

To use the above routine the cards testing on user ID and field number must be made up each time specifying the desired codes within the parentheses. Where users have a common practice in assigning the same field numbers to similar material and it is desired to consolidate their vocabularies, the test on user ID may be withdrawn and the routine followed by a sort instruction: SORT 1,4 BY 0,49 AND 90,12,102 END.

```
SL2 FORMAT 1,2 FROM 1,4
1.   READ
     IF ANY IN 0,2 EQ (  ) DO 1
     IF ANY IN 80,4 NQ (****)
     OR ANY IN 80,4 NQ (****) DO 1         **** = user ID + field no.
```

```
2.   SET IN 0,25 AT OUT 0 AND IN 90,12 AT OUT 25
     AND IN 84,4 AT OUT 40 AND IN 80,23 AT OUT 80
3.   WRITE OUT 0,102 DO 1 END
```

As in the previous routine the cards testing on user ID and field no. must be made up to match the desired selection, entering the required codes within the parentheses replacing the asterisks, above. The update print routine for list records may be used to print the tapes produced by this process.

5.2.5 PRINT ROUTINE CORRESPONDING TO SL2 FORMAT (See Also Section 3.2.3.5)

```
PRINT 1,4
A.   READ
     IF ANY IN 0,2 EQ (  ) DO A
     IF ANY IN 80,4 NQ (****) DO A                    **** = user ID + field no.
     IF IN 80,4 NQ TEMP 190,4 SET IN 80,4 AT TEMP 190,4 RESTORE
     IF LINE 0,3 GR (53) AND IN 0,2 NQ (  ) RESTORE
     IF LINE 0,3 EQ (1) SET (SURF INDEX) AT OUT 34
     PRINT SKIP 1 DO B ELSE.  DO C
B.   SET (FIELD NO.) AT OUT 0 AND IN 83,1 AT OUT 10
     SET (FOR) AT OUT 35 AND IN 80,3 AT OUT 40
     PRINT SKIP 2
C.   SET IN 0,25 AT OUT 0 AND IN 90,12 AT OUT 25
     AND IN 84,4 AT OUT 40 PRINT SKIP 1 DO A
END OF SELECTIVE-PRINT
```

As in the previous 2 routines the astrisks within the parentheses in the 4th instruction above must be replaced by the desired user ID code plus field number.

## 6. APPENDIX B: EXAMPLES OF SURF INDEXES

This appendix presents five examples of SURF indexes that illustrate different kinds of use. They were produced by selecting a few cards from each user's files and processing them especially for this display.

### 6.1 FIGURE 4--A BIBLIOGRAPHIC APPLICATION

Figure 4 illustrates the kind of index produced for SDC's Information Processing Information Center (IPIC) under format option A1. The index represents technical documents contained in the Center's collection. For this application, field number 1 has been assigned to author(s), field number 2 and 8 to unsorted elements, field number 3 to keywords from the titles, and field number 7 to classification categories developed by the Center for cataloging its documents. As can be seen, the contents of field number 7 appear but once as an alphabetized key to the indexed entries.

### 6.2 FIGURE 5--AN EXAMPLE OF FORMAT OPTION B1

Figure 5 presents the results of processing the same input as shown in the coding sheet proof of Figure 4 under format option B1. That is, the classification categories assigned to field number 7 now appear as a part of every entry.

### 6.3 FIGURE 6--AN ENGINEER'S KEY TO TRADE CATALOG DATA

Figure 6 shows an index to the contents of a mechanical engineer's trade catalog collection. Here the assignment of field numbers is 1 to manufacturer or dealer, 2 to various unsorted elements, 3 to subject keywords, and 4 to location in the engineer's vertical files.

### 6.4 FIGURE 7--A DICTIONARY OF GRAMMAR RULES

Figure 7 presents part of a dictionary of context-free grammar rules for describing English grammar. The dictionary was used as a bookkeeping aid in the development of a query analysis program. Each entry on the coding sheet proof represents a separate syntax rule. The indexed elements provide access by syntax categories within rules, and by processing rules and labels associated with the syntax rules. The latter are assigned to field number 3 in the index. Field number 1 is assigned to the syntax categories identified here as QUERY, QWORD (question word), CLAUSE, VERBP (verb phrase), etc.

### 6.5 FIGURE 8--AN INDEX TO 35MM SLIDES

This index was initiated by SDC's Corporate Communications to develop better access to the wealth of information contained in its large and varied collection of 35mm slides. Each slide was made for a single presentation, briefing or paper but contains information that would be very useful for similar purposes

at a later time. Index categories are assigned to authors and users, titles, and subject descriptors. The coding sheet proof has been omitted from the figure in order to show more of the index. The entry numbers, apart from those beginning with A, identify slide numbers.

CODING SHEET PROOF FOR IPC

```
ENTRY  0001                                          FORMAT  A1
1 1) ** AUTHOR INDEX 8) THIS INDEX INCLUDES PERSONS AND ORGANIZATIONS.

ENTRY  0002                                          FORMAT  A1
1 3) ** TITLE INDEX 8) THIS INDEX IS ARRANGED BY KEYWORDS AND PHRASES D
2 RAWN FROM THE TITLES OF THE DOCUMENTS.

ENTRY  0003                                          FORMAT  A1
1 7) ** IPIC CLASSIFICATION 8) THIS CLASSIFIED CATALOG REFLECTS THE SHE
2 LVING ORDER IN IPIC. 8) A SINGLE * FOLLOWING A CLASS DESIGNATION INDI
3 CATES THAT THE DOCUMENT IS SHELVED IN THAT CLASS.

ENTRY  2159                                          FORMAT  A1
1 1) HERRIOT, J.G. 2) SOME OBSERVATIONS ON 3) ALGOL 2) TO THE 3) BURROU
2 GHS 220. 1) STANFORD UNIV, 4) TECH.RPT. NO. 9, 2) 16 PAGES. 6) 1960 N
3 OV 7 7) 06.7 ALGOL PROGRAMMING LANGUAGE 7) 05.7 BURROUGHS 220 COMPUTE
4 R

ENTRY  2160                                          FORMAT  A1
1 1) SCHUMAN, A.D. 2) THE 3) TRANSLITERATION OF 3) ALGOL 2) TO THE 3) B
2 URROUGHS 3) ALGEBRAIC COMPILER LANGUAGE. 1) BURROUGHS CORP, 2) 29 PAG
3 ES. 6) 1960 MAR 29 7) 06.7 ALGOL PROGRAMMING LANGUAGE 7) 05.7 BURROUG
4 HS 220 COMPUTER
```

SURF INDEX

```
FIELD NO. 1                          FOR  IPC                          ENTRY NO.

** AUTHOR INDEX                                                            1
        ** AUTHOR INDEX   THIS INDEX INCLUDES PERSONS AND ORGANIZATIONS.
BURROUGHS CORP,                                                          2160
        SCHUMAN, A.D.   THE   TRANSLITERATION OF   ALGOL   TO THE   BURROU
        GHS   ALGEBRAIC COMPILER LANGUAGE.   BURROUGHS CORP,   29 PAGES.
         1960 MAR 29
HERRIOT, J.G.                                                            2159
        HERRIOT, J.G.   SOME OBSERVATIONS ON   ALGOL   TO THE   BURROUGHS
        220.   STANFORD UNIV,   TECH.RPT. NO. 9,   16 PAGES.   1960 NOV 7

SCHUMAN, A.D.                                                            2160
        SCHUMAN, A.D.   THE   TRANSLITERATION OF   ALGOL   TO THE   BURROU
        GHS   ALGEBRAIC COMPILER LANGUAGE.   BURROUGHS CORP,   29 PAGES.
         1960 MAR 29
STANFORD UNIV,                                                           2159
        HERRIOT, J.G.   SOME OBSERVATIONS ON   ALGOL   TO THE   BURROUGHS
        220.   STANFORD UNIV,   TECH.RPT. NO. 9,   16 PAGES.   1960 NOV 7
```

**Figure 4. A Bibliographic Application (Sheet one)**

SURF INDEX

FIELD NO. 3 FOR IPC ENTRY NO.

** TITLE INDEX 2
** TITLE INDEX THIS INDEX IS ARRANGED BY KEYWORDS AND PHRASES DR AWN FROM THE TITLES OF THE DOCUMENTS.

ALGEBRAIC COMPILER LANGUAGE. 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29

ALGOL 2159
HERRIOT, J.G. SOME OBSERVATIONS ON ALGOL TO THE BURROUGHS 220. STANFORD UNIV, TECH.RPT. NO. 9, 16 PAGES. 1960 NOV 7

ALGOL 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29

BURROUGHS 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29

BURROUGHS 220. 2159
HERRIOT, J.G. SOME OBSERVATIONS ON ALGOL TO THE BURROUGHS 220. STANFORD UNIV, TECH.RPT. NO. 9, 16 PAGES. 1960 NOV 7

TRANSLITERATION OF 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29

SURF INDEX

FIELD NO. 7 FOR IPC ENTRY NO.

** IPIC CLASSIFICATION 3
THIS CLASSIFIED CATALOG REFLECTS THE SHELVING ORDER IN IPIC.

05.7 BURROUGHS 220 COMPUTER 2159
HERRIOT, J.G. SOME OBSERVATIONS ON ALGOL TO THE BURROUGHS 220. STANFORD UNIV, TECH.RPT. NO. 9, 16 PAGES. 1960 NOV 7

05.7 BURROUGHS 220 COMPUTER 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29

06.7 ALGOL PROGRAMMING LANGUAGE 2159
HERRIOT, J.G. SOME OBSERVATIONS ON ALGOL TO THE BURROUGHS 220. STANFORD UNIV, TECH.RPT. NO. 9, 16 PAGES. 1960 NOV 7

06.7 ALGOL PROGRAMMING LANGUAGE 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29

**Figure 4. (Sheet two)**

SURF INDEX

FIELD NO. 1 FOR IPC ENTRY NO.

** AUTHOR INDEX 1
** AUTHOR INDEX THIS INDEX INCLUDES PERSONS AND ORGANIZATIONS.
BURROUGHS CORP, 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29 06.7 ALGOL PROGRAMMING LANGUAGE 05.7 BURROUGHS 22 0 COMPUTER
HERRIOT, J.G. 2159
HERRIOT, J.G. SOME OBSERVATIONS ON ALGOL TO THE BURROUGHS 220. STANFORD UNIV, TECH.RPT. NO. 9, 16 PAGES. 1960 NOV 7 06.7 ALGOL PROGRAMMING LANGUAGE 05.7 BURROUGHS 220 COMPUTER
SCHUMAN, A.D. 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES.

SURF INDEX

FIELD NO. 3 FOR IPC ENTRY NO.

** TITLE INDEX 2
** TITLE INDEX THIS INDEX IS ARRANGED BY KEYWORDS AND PHRASES DR AWN FROM THE TITLES OF THE DOCUMENTS.
ALGEBRAIC COMPILER LANGUAGE. 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29 06.7 ALGOL PROGRAMMING LANGUAGE 05.7 BURROUGHS 22 0 COMPUTER

SURF INDEX

FIELD NO. 7 FOR IPC ENTRY NO.

** IPIC CLASSIFICATION 3
** IPIC CLASSIFICATION THIS CLASSIFIED CATALOG REFLECTS THE SHEL VING ORDER IN IPIC.

05.7 BURROUGHS 220 COMPUTER 2159
HERRIOT, J.G. SOME OBSERVATIONS ON ALGOL TO THE BURROUGHS 220. STANFORD UNIV, TECH.RPT. NO. 9, 16 PAGES. 1960 NOV 7 06.7 ALGOL PROGRAMMING LANGUAGE 05.7 BURROUGHS 220 COMPUTER
05.7 BURROUGHS 220 COMPUTER 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29 06.7 ALGOL PROGRAMMING LANGUAGE 05.7 BURROUGHS 22 0 COMPUTER
06.7 ALGOL PROGRAMMING LANGUAGE 2159
HERRIOT, J.G. SOME OBSERVATIONS ON ALGOL TO THE BURROUGHS 220. STANFORD UNIV, TECH.RPT. NO. 9, 16 PAGES. 1960 NOV 7 06.7 ALGOL PROGRAMMING LANGUAGE 05.7 BURROUGHS 220 COMPUTER
06.7 ALGOL PROGRAMMING LANGUAGE 2160
SCHUMAN, A.D. THE TRANSLITERATION OF ALGOL TO THE BURROU GHS ALGEBRAIC COMPILER LANGUAGE. BURROUGHS CORP, 29 PAGES. 1960 MAR 29 06.7 ALGOL PROGRAMMING LANGUAGE 05.7 BURROUGHS 22 0 COMPUTER

**Figure 5. An Example of Format Option B1**

CODING SHEET PROOF FOR HEI

```
ENTRY  0001                                          FORMAT  A1
1 3) GEARS, 3) NYLON, 3) WORM 1) CREATIVE ENGINEERING CO. 4) FC

ENTRY  0002                                          FORMAT  A1
1 3) MOTORS, 2) SHADED POLE 1) BREVEL CO. 4) FB

ENTRY  0003                                          FORMAT  A1
1 3) CLUTCHES, 2) INDEXING, 2) OVERRUN, 2) BACKSTOP, 1) MORSE CO. 4) FC

ENTRY  0004                                          FORMAT  A1
1 3) FASTENERS, 2) SELF LOCKING, 1) BOOTS CO. 4) FB

ENTRY  0005                                          FORMAT  A1
1 3) CLUTCH, 2) MAGNETIC, 3) BRAKES, 1) VICKERS ELECTRIC 4) FV

ENTRY  0006                                          FORMAT  A1
1 3) SEALS, 3) LUBE DEVICES 1) GITS 4) FG

                                SURF INDEX

FIELD NO. 1                      FOR  HEI                        ENTRY NO.

BOOTS CO.                                                            4
        FASTENERS,   SELF LOCKING,   BOOTS CO.   FB
BREVEL CO.                                                           2
        MOTORS,   SHADED POLE   BREVEL CO.   FB
CREATIVE ENGINEERING CO.                                             1
        GEARS,   NYLON,   WORM   CREATIVE ENGINEERING CO.   FC
GITS                                                                 6
        SEALS,   LUBE DEVICES   GITS   FG
MORSE CO.                                                            3
        CLUTCHES,   INDEXING,   OVERRUN,   BACKSTOP,   MORSE CO.   FC
VICKERS ELECTRIC                                                     5
        CLUTCH,   MAGNETIC,   BRAKES,   VICKERS ELECTRIC   FV

                                SURF INDEX

FIELD NO. 3                      FOR  HEI                        ENTRY NO.

BRAKES,                                                              5
        CLUTCH,   MAGNETIC,   BRAKES,   VICKERS ELECTRIC   FV
CLUTCH,                                                              5
        CLUTCH,   MAGNETIC,   BRAKES,   VICKERS ELECTRIC   FV
CLUTCHES,                                                            3
        CLUTCHES,   INDEXING,   OVERRUN,   BACKSTOP,   MORSE CO.   FC
FASTENERS,                                                           4
        FASTENERS,   SELF LOCKING,   BOOTS CO.   FB
GEARS,                                                               1
        GEARS,   NYLON,   WORM   CREATIVE ENGINEERING CO.   FC
LUBE DEVICES                                                         6
        SEALS,   LUBE DEVICES   GITS   FG
MOTORS,                                                              2
        MOTORS,   SHADED POLE   BREVEL CO.   FB
NYLON,                                                               1
        GEARS,   NYLON,   WORM   CREATIVE ENGINEERING CO.   FC
SEALS,                                                               6
        SEALS,   LUBE DEVICES   GITS   FG
WORM                                                                 1
        GEARS,   NYLON,   WORM   CREATIVE ENGINEERING CO.   FC
```

**Figure 6. An Engineer's Key to Trade Catalog Data**

CODING SHEET PROOF FOR KEL

```
ENTRY  0001                                              FORMAT  A1
1 1) QUERY 1) QWORD 1) CLAUSE 3) P1/A

ENTRY  0002                                              FORMAT  A1
1 1) QUERY 1) QWORD 1) VERBP 3) P1/B

ENTRY  0003                                              FORMAT  A1
1 1) QUERY 1) VERBP 3) P1/C

ENTRY  0004                                              FORMAT  A1
1 1) CLAUSE 1) NOUNP 1) VERBP 3) P2

ENTRY  0005                                              FORMAT  A1
1 1) NOUNP 1) NAMEP
```

SURF INDEX FOR KEL

| FIELD NO. 1 | | | | | ENTRY NO. |
|---|---|---|---|---|---|
| CLAUSE | | | | | 4 |
| | CLAUSE | NOUNP | VERBP | P2 | |
| CLAUSE | | | | | 1 |
| | QUERY | QWORD | CLAUSE | P1/A | |
| NAMEP | | | | | 5 |
| | NOUNP | NAMEP | | | |
| NOUNP | | | | | 4 |
| | CLAUSE | NOUNP | VERBP | P2 | |
| NOUNP | | | | | 5 |
| | NOUNP | NAMEP | | | |
| QUERY | | | | | 1 |
| | QUERY | QWORD | CLAUSE | P1/A | |
| QUERY | | | | | 2 |
| | QUERY | QWORD | VERBP | P1/B | |
| QUERY | | | | | 3 |
| | QUERY | VERBP | P1/C | | |
| QWORD | | | | | 1 |
| | QUERY | QWORD | CLAUSE | P1/A | |
| QWORD | | | | | 2 |
| | QUERY | QWORD | VERBP | P1/B | |
| VERBP | | | | | 4 |
| | CLAUSE | NOUNP | VERBP | P2 | |
| VERBP | | | | | 2 |
| | QUERY | QWORD | VERBP | P1/B | |
| VERBP | | | | | 3 |
| | QUERY | VERBP | P1/C | | |

SURF INDEX FOR KEL

| FIELD NO. 3 | | | | | ENTRY NO. |
|---|---|---|---|---|---|
| P1/A | | | | | 1 |
| | QUERY | QWORD | CLAUSE | P1/A | |
| P1/B | | | | | 2 |
| | QUERY | QWORD | VERBP | P1/B | |
| P1/C | | | | | 3 |
| | QUERY | VERBP | P1/C | | |
| P2 | | | | | 4 |
| | CLAUSE | NOUNP | VERBP | P2 | |

**Figure 7. A Dictionary of Grammar Rules**

SURF INDEX

FIELD NO. 1 FOR NR1 ENTRY NO.

**AUTHOR/USER A001
**AUTHOR/USER THIS INDEX NAMES THE PERSON WHO WAS PRINCIPAL USER AND/OR THE PERSON RESPONSIBLE FOR GATHERING THE INFORMATION PRESENTED.
CANTER P003
MAR/65 CANTER LINTNER PERSONNEL LOCATION MAP UNITED STATES
CANTER P001
MAR/65 CANTER LINTNER MILITARY CONTRACT PIE-CHART, COLOR, B AND W.
CANTER P002
MAR/65 CANTER LINTNER REVIEW OF SDC CONTRACT PERFORMANCE CONTRACT PERFORMANCE OVERRUN UNDERRUN

SURF INDEX

FIELD NO. 3 FOR NR1 ENTRY NO.

**TITLE INDEX A002
**TITLE INDEX IF A SLIDE DOES NOT HAVE A TITLE, IT IS NOT LISTED HERE. SLIDE TITLES ARE VERY RICH IN INFORMATION AND PROVIDE GOOD ACCESS.
REVIEW OF SDC CONTRACT PERFORMANCE P002
MAR/65 CANTER LINTNER REVIEW OF SDC CONTRACT PERFORMANCE CONTRACT PERFORMANCE OVERRUN UNDERRUN

SURF INDEX

FIELD NO. 5 FOR NR1 ENTRY NO.

**DESCRIPTORS INDEX A003
**DESCRIPTORS INDEX WE HAVE ATTEMPTED TO ASSIGN DESCRIPTIVE TERMS TO THE MAJOR INFORMATION CHARACTERISTICS OF THE INDEXED SLIDES. THIS IS A COMPLETE INDEX. ALL SLIDES ARE DESCRIBED HEREIN.
CONTRACT P001
MAR/65 CANTER LINTNER MILITARY CONTRACT PIE-CHART, COLOR, B AND W.
CONTRACT PERFORMANCE P002
MAR/65 CANTER LINTNER REVIEW OF SDC CONTRACT PERFORMANCE CONTRACT PERFORMANCE OVERRUN UNDERRUN
MAP P003
MAR/65 CANTER LINTNER PERSONNEL LOCATION MAP UNITED STATES
MILITARY P001
MAR/65 CANTER LINTNER MILITARY CONTRACT PIE-CHART, COLOR, B AND W.
OVERRUN P002
MAR/65 CANTER LINTNER REVIEW OF SDC CONTRACT PERFORMANCE CONTRACT PERFORMANCE OVERRUN UNDERRUN
PERSONNEL LOCATION P003
MAR/65 CANTER LINTNER PERSONNEL LOCATION MAP UNITED STATES
UNDERRUN P002
MAR/65 CANTER LINTNER REVIEW OF SDC CONTRACT PERFORMANCE CONTRACT PERFORMANCE OVERRUN UNDERRUN
UNITED STATES P003
MAR/65 CANTER LINTNER PERSONNEL LOCATION MAP UNITED STATES

**Figure 3. An Index to 35mm Slides**

# 7. APPENDIX C: INSTRUCTIONS TO MACHINE & KEYPUNCH OPERATORS

## 7.1 INSTRUCTIONS TO MACHINE OPERATORS

Mount a file-protected MADAM MASTER Tape on tape drive 1, and a blank on tape drive 2. Load from tape. The system will write on drive 2 and rewind. Remove the MASTER tape from drive 1 and store. Put the reel from tape drive 2 onto tape drive 1. This tape is now an operating system tape. Do not file-protect this tape or other tapes when running SURF jobs. The operating system tape may be saved for successive SURF runs unless it is damaged through machine malfunction or wear and tear on the tape.

Place blanks on tape drives 2, 3 and 4, the old entry record tape on drive 5 and the old list tape on drive 6. Put the SURF specification deck in the reader, activate sense switches A and B, load from tape, press START. Program and operator instructions are outputed on the printer. Look for the instruction: **** END OF JOB SAVE TAPES which will signal the end of a run.

If the machine halts with no error message, press START. If a process is interrupted, it will be necessary to reinitiate the system through rewinding tape drive 1, loading from tape, and rereading the SURF specifications for the routine interrupted. If the operating system tape appears damaged, move the reel to tape drive 2, mount the MADAM MASTER tape on drive 1, load from tape, etc., as described above.

The paper normally required for SURF printouts is white unlined single-part medium-width paper perforated on one edge. The output uses a standard carriage tape and the print position lineup is 80-column with the print beginning 1 inch from the left edge of the paper. The perforated edge is placed on the right. The printout is burst, the perforated edge stripped, and each user's index bound separately after removing the SURF program instructions. Each user is identified by a three-digit code printed at the head of each sheet following the legend: SURF INDEX FOR ... or CODING SHEET PROOF FOR ...

If an additional copy of the MADAM MASTER Tape is desired, mount the MADAM operating system on tape drive 1, the MASTER tape on drive 2 and blanks on drives 3 and 4. Prepare a card formatted as follows:

COPY 1,3 FROM 1,2 END and put in card reader. Load from tape, press start.

## 7.2 KEYPUNCH INSTRUCTIONS

A.

1. Keypunch and verify, from "SURF Input Coding Sheet," Figure 1.

| | | |
|---|---|---|
| ID Code | Col. | 1-3 |
| Output Format | " | 4-5 |
| Entry No. | " | 6-9 |
| Numbered Field and Field Controls | " | 11-79 |

2. Place keypunched deck in keypunch and punch
   Card No. Col. 10
   Note: Cards are numbered within "Entry No."
3. Sort Col. 1-10
4. Route all "SURF Input Coding Sheets" and cards to requestor.

B. Special Keypunching Instructions

1. If a word or number is completed when Col. 79 is reached, Col. 11 in the following card must be a blank when there is a next card to be punched with the same entry number.
2. If a word or number is not completed when Col. 79 is reached, continue the word or number in Col. 11 of the following card.

   The only exception to spacing is that a number followed by a parenthesis cannot be split. When the number followed by a parenthesis is going to fall in Col. 79 leave Col. 79 blank and punch the number followed by a parenthesis in Col. 11 of the next card.
3. The 11th column of card number 1 of each entry number must contain an arabic numeral followed by a parenthesis. If the coding sheet does not reflect this, return it to the requestor for correction.

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13. ABSTRACT

SURF is an EDP-based service for Support of User Records and Files. SURF is designed to meet, or be adapted to, a variety of unique requirements fulfilling the needs of individuals in organizing, maintaining and finding what is in their personal files. Without extensive reprogramming for unusual or special demands. It is programmed in SDC's MADAM language which is implemented for an 8K IBM 1401, or IBM 360/30 with 1401 emulator. This document describes SURF routines and associated operational requirements in detail sufficient for using the programs. Included are a summary of the history and purpose of SURF development, SURF usage, and a functional description of inputs, outputs and processes. Three appendices present complete listings of instructions for each routine, examples of the variety of inputs and outputs required by different SDC users, and operational instructions to keypunch and machine operators.

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| 14. KEY WORDS | LINK A | | LINK B | | LINK C | |
|---|---|---|---|---|---|---|
| | ROLE | WT | ROLE | WT | ROLE | WT |
| Support of User Records & Files<br>SURF<br>File Organization | | | | | | |

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